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STUDIES IN THE MAN-SYSTEM INTERFACE
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Report No. 2

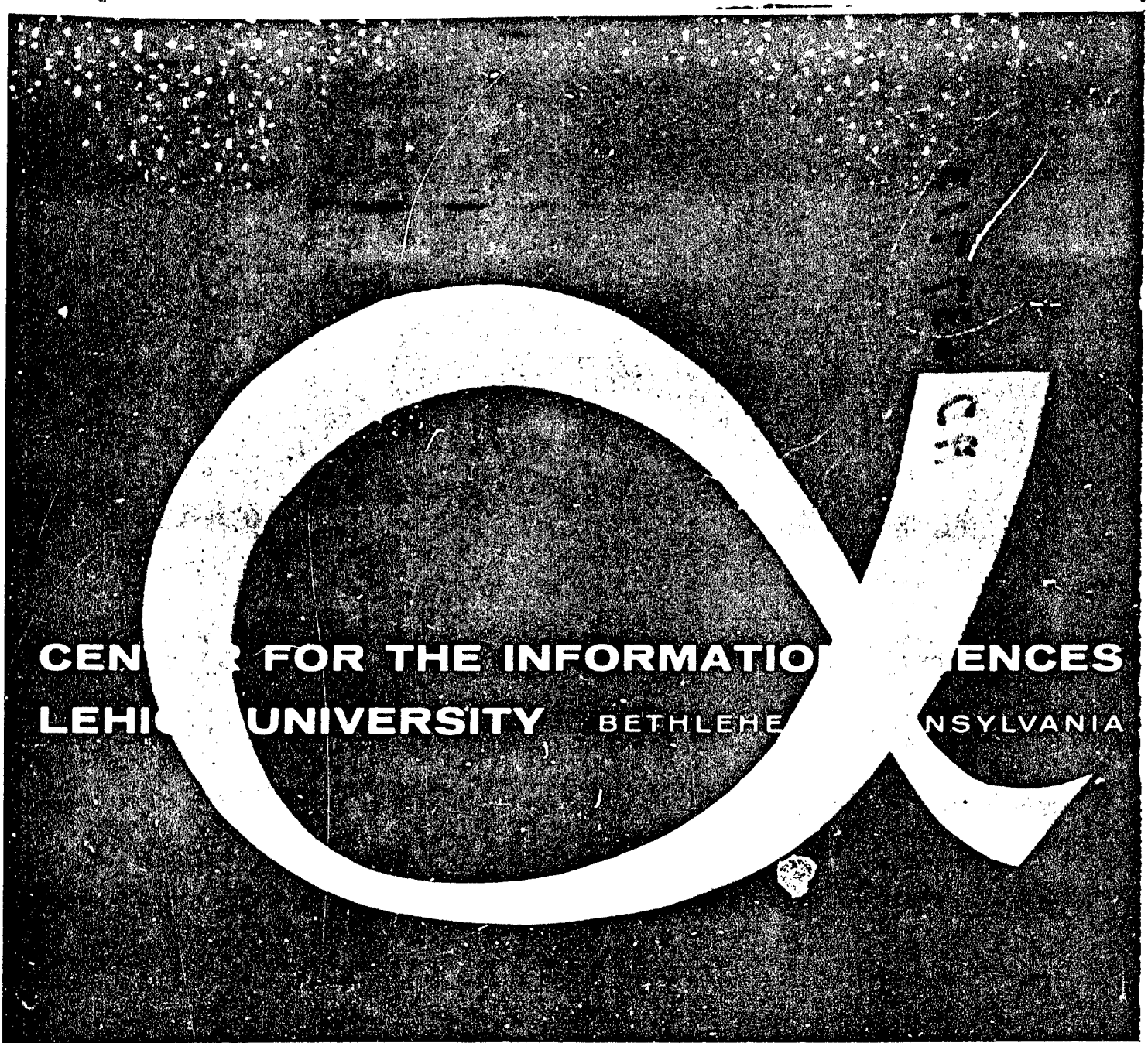
The Application of Psychometric Techniques to Determine the Attitudes of Individuals Toward Information Seeking

by

Victor Rosenberg

The work reported here was partially supported by grants from the Air Force Office of Aerospace Research, AF-AFOSR-724-66, and from the National Science Foundation, NSF-GE-2569.

July 1966



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THE APPLICATION OF PSYCHOMETRIC TECHNIQUES TO DETERMINE THE ATTITUDES OF INDIVIDUALS TOWARD INFORMATION SEEKING AND THE EFFECT OF THE INDIVIDUAL'S ORGANIZATIONAL STATUS ON THESE ATTITUDES

by
Victor Rosenberg

A Thesis

Presented to the Graduate Faculty

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Lehigh University

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This thesis is accepted and approved in partial fulfillment of the requirements for the degree of Master of Science.

May 23, 1966
(Date)

Francis J. Wuest
Professor in charge

Richard S. Taylor
Head of the Department

ACKNOWLEDGEMENTS

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ABSTRACT

A structured questionnaire was administered to professional personnel in industrial and government organizations, asking the subjects to rank eight information gathering methods according to their preference in given hypothetical situations. The subjects were then asked to rate the methods on a seven point scale according to (a) ease of use and (b) amount of information expected. The subjects were divided into two groups determined by their time spent in research or research related activities. The groups were designated "research" and "nonresearch".

A statistical analysis of the data from 94 subjects (52 in research, 44 in nonresearch) showed that no statistically significant differences were present in either the rankings or ratings between research and nonresearch personnel. A high significant correlation was found, however, between the preference ranking and the ease of use rating within both groups, whereas no significant correlation was found between the preference ranking and the amount of information ratings.

The results of the study infer that the ease of use of an information gathering method is more important than the amount of information expected for information gathering methods in industrial and governmental environments, regardless of the research orientation of the users.

INTRODUCTION

Many recent studies have attempted to investigate the behavioral aspects of the information gathering process. Generally, these studies have developed an insight into the ways by which scientists obtain information, and have developed the methodology for such studies. A number of studies have also sought to determine the actual information needs of scientists. Generally neglected, however, are attempts to discover (a) why individuals prefer certain methods, (b) what attributes of information gathering methods are important, and (c) if the study of the information seeking process should be restricted to research scientists. The purpose of this study is to investigate such questions, in an attempt to make the interpretation of results from information-user studies more meaningful.

Most efforts in the actual development of information retrieval systems have been based, either explicitly or implicitly, on the assumption that the greatest need for improved availability of information exists among research scientists. Although differences exist in the types of information required by different professions, it is not at all clear that the basic principles underlying the development of retrieval systems should be different for different environments.

METHOD

To obtain the data for the investigation, a structured questionnaire was administered to a selected group of subjects. The questionnaire was designed to minimize the inconvenience of the subjects while extracting the necessary information.

The questionnaire first asked the subject to indicate whether he spent more than fifty percent of his time in research or research related activities. This question separated the subjects into two groups: (a) "research" and (b) "nonresearch". All data were analyzed between the two groups.

Part I of the questionnaire presented the subject with three hypothetical situations which required information and which would be likely to be part of his general experience. The situations presented concerned research for a proposal, research for a journal article, and research on work being done in a particular field. The purpose of a given hypothetical situation was to establish a frame of reference within which the subject was asked to rank eight information gathering methods. The same eight methods were presented in each of the hypothetical situations, but in each case rearranged in a different, random order, minimizing the possibility of subsequent questions being influenced by previous ones (i.e., order effects).

The information gathering methods were selected from a group of methods which appeared in an earlier study (Rosenberg, 1965)[1]. From a list of twenty-three items, the most popular, on the basis of choice by the subjects of that study, were selected and modified. The methods were thus representative of generally used information seeking techniques.

Part IIA of the questionnaire, listing the same eight methods as in Part I, asked the subject to rate each method by the criterion of ease of use. The subject rated the method on a seven point scale ranging from "extremely simple" to "extremely difficult".

Similarly in Part IIB, the subject was asked to rate the methods by the criterion of amount of information expected, rating the methods from "very little" to "very much" information expected. As in Part I, the order of presentation was randomized. Part II was prepared in four sets, each set listing the methods in a different random order, to minimize any possibility of order effects. A sample questionnaire appears as Appendix I.

SELECTION OF SUBJECTS

The population from which the sample was taken was professional personnel employed by scientific organizations. The sample was more specifically defined as persons holding at least a bachelors degree, employed in organizations with interests in scientific research.

An attempt was made to secure employee directories from which to draw a random sample. The cooperating organizations indicated, however that the release of such directories was against corporate policy, so that an alternative sampling procedure was used. Six organizations cooperated in the project, and in each case a quantity of questionaires was sent to a cooperating individual, who was instructed to distribute the questionnaire to professionals in his organization representing as many departments as possible. The questionnaires were returned by mail.

The cooperating organizations were: International Business Machin Corporation, Research Division, San Jose, California; International Business Machines Corporation, Thomas J. Watson Research Center,

Yorktown Heights, New York; Merck and Company, West Point, Pennsylvania; Arthur D. Little, Inc., Cambridge, Massachusetts; Air Products and Chemicals, Inc., Allentown, Pennsylvania; and the United States Naval Air Turbine Test Station, Trenton, New Jersey. The choice of co-operating organizations was dictated only by the effort to obtain approximately equal numbers of subjects for both the research and non-research categories. Within the limited objectives of the study, the sample was sufficiently diverse to eliminate any obvious bias.

RESULTS

The entire distribution of the questionnaire to the six cooperating organizations totalled 175. One hundred and six questionnaires were completed and returned. Eleven percent (12) of the returned questionnaires were rejected because certain parts of the questionnaire were incorrectly or incompletely filled out. Table 1. shows the distribution statistics for the questionnaire. Since no due date was given to the subjects, some of the questionnaires were returned after the completion of the analysis and therefore were not included in the sample.

Total questionnaires	No. returned correct	No. returned reject
175	94	12

Table 1. Distribution Data

The subjects were divided into the "research" and "nonresearch" categories on the basis of question number one. The resulting set of usable questionnaires contained 52 (55 percent) in the research category

and 44 (45 percent) in the nonresearch category.

The data resulting from Part I of the study consisted of sets of ranked items for each of the three hypothetical situations, listed in the data as questions (Table 2). Thus for each group of

---

No.1. You are working on a design for a procedure or experiment and wish to know if similar work has been done or is currently being done by someone else.

No.2. You are preparing a proposal for a new project either to the management of your organization or to an outside agency. You wish to substantiate the proposal with a thorough bibliography. The proposal involves approximately $60,000.

No.3. You wish to gather information in order to write an article in your area of specialization for a trade or research journal.

Table 2. Hypothetical situations listed as questions.

---

subjects there were three sets of ranks and the degree of consistency in the ranking was measured within each group, for each question separately and averaged for the set of all three taken together. The data for Part I is tabulated in Appendix II.

To measure the consistency of ranking among subjects, the Kendall coefficient of concordance, W, was used. The test ascertains the overall agreement among k sets of rankings (i.e. the association among them). If there were perfect agreement among the subjects in their ranking, each method would have the same rank for each subject. The Kendall coefficient of concordance is an approximate index of the divergence of the actual agreement shown in the data from the maximum possible (perfect) agreement.[2]

Computing W for each question in a given group,

$$W = \frac{s}{1/12\ k^2(N^3 - N)}$$

where

s = sum of squares of the observed deviations from the mean of the totals R_j,

thus,

$$s = \sum \left(R_j - \frac{R_j}{N}\right)^2$$

k = number of sets of rankings, i.e. the number of subjects

N = number of items ranked

and the denominator, $1/12\ k^2(N^3-N)$ is the maximum possible sum of squared deviations.

For the data shown in Appendix II, the resulting coefficients of concordance are shown in Table 3.

		Question			
Group	k	no.1	no.2	no.3	Average
Research	52	0.452	0.511	0.539	0.501
Nonresearch	44	0.326	0.352	0.469	0.382

Table 3. Kendall W for Part I

The statistic, W, is linearly related to the χ^2 (chi-square) by the formula:

$$\chi^2 = k(N-1)W$$

The χ^2 statistic is used to test the statistical significance of W.

In the resulting chi-square table (Table 4) all entries are significant at the 0.05 level.

		Question			
Group	k	no.1	no.2	no.3	d.f.
Research	52	164.528	186.004	196.196	7
Nonresearch	44	100.408	108.416	144.452	7

Table 4. χ^2 for Part I

The correlation between the rankings of the two groups was measured by applying the Spearman rank correlation coefficient: r_s to the ranks of the totals of each method for each question and for the totals over the three questions. Kendall[3] claims that the best estimate of the ranking of N items is the ranking of the sums of the various rankings, provided W is significant. The ranks of the various sums (Table 5) are used to find r_s.

	Questions							
	Q_1		Q_2		Q_3		totals	
Methods	R	NR	R	NR	R	NR	R	NR
1	1	4	2	3	1	1	1	1.5
2	2	2	1	1	2	2	2	1.5
3	8	8	8	8	8	8	8	8
4	6	6	4.5	6	5	6	5	6
5	5	5	3	4.5	4	4	4	5
6	3	1	4.5	2	3	3	3	3
7	7	7	7	7	7	7	7	7
8	4	3	6	4.5	6	5	6	4

Note: R = research, NR=nonresearch

Table 5. Ranks of totals

The methods are listed by numbers which are interpreted in Table 6. The fractional rankings represent ties which are averaged for the computation.

The numbering of information gathering methods in the text corresponds to the following listing:

Methods

No. 1 Search your personal library.

No. 2 Search material in the same building where you work, excluding your personal library.

No. 3 Visit a knowledgeable person — 20 miles away or more.

No. 4 Use a library that is not within your organization.

No. 5 Consult a reference librarian.

No. 6 Visit a knowledgeable person nearby (within your organization).

No. 7 Write a letter requesting information from a knowledgeable person — 20 miles away or more.

No. 8 Telephone a knowledgeable person who may be of help.

Table 6. Numbering of methods.

The statistic, r_s, is calculated by the formula:

$$r_s = 1 - \frac{6 \sum_{i=1}^{n} d_i^2}{N^3 - N}$$

where

d_i = the deviation between two ranks

and

N = number of items ranked.

For the data shown the r_s in each case is significant at the 0.05 level.

	Question			
	no.1	no.2	no.3	totals
r_s =	0.833	0.786	0.976	0.923

Table 7. r_s between groups

The statistic r_s is a one tailed test showing that a significant relationship exists in the data. It is a nonparametric test having an efficiency of 91 percent when compared to the Pearson r.[4]

The data in Part II of the questionnaire were ratings given to each method on the criteria (a) ease of use and (b) amount of information. The data for Part II are tabulated in Appendix III and the methods are referred to by numbers as listed in Table 6.

For the data of the "ease of use" ratings the null hypothesis was that no difference existed in the mean ratings given the methods by the two groups (i.e. $H_o : \mu_R = \mu_{NR}$ for all methods). The null hypothesis was tested using standard t tests corrected by Sheffe's method, which is the most conservative of the generally used procedures for correcting critical values when a number of t tests are used.[5] The results of the t tests for the "ease of use" ratings are shown in Table 8. The t tests were calculated by the computational

	Methods							
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8
t =	.780	.434	.752	.419	.362	.375	.507	.792

Table 8. t tests for ease of use ratings.

formulae:[6]

$$t^2 = \frac{(n_a - n_b - 2)(n_b \Sigma X_a - n_a \Sigma X_b)^2}{(n_a - n_b)(n_b L_a - n_a L_b)}$$

where:

$$L_a = n_a \Sigma X_a^2 - (\Sigma X_a)^2$$

$$L_b = n_b \Sigma X_b^2 - (\Sigma X_b)^2$$

and

n_a = sample size for group 1

n_b = sample size for group 2

and X_a & X_b are the scores.

None of the results of the t test are significant at the 0.05 level.

A similar analysis was performed on the data from Part IIB, the "amount of information" ratings. The results of the t test for these data (Table 9) again show no significant difference at the 0.05 level.

	Methods							
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8
t =	.718	.989	.754	1.007	.587	.548	.398	.596

Table 9. t tests for amount of information ratings

The results from Parts I and II were then compared by finding correlation coefficients between the sets of ranks and the sets of ratings for each group. To find the correlation coefficients a ranking was derived from the average ratings of the methods in each case and compared to the ranks given by the subjects (Table 10). The Spearman

Research

Method	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8
Subject Ranking	1	2	8	5	4	3	7	6
Derived Ease of Use Ranking	1	2	8	6	5	4	7	3
Derived Amount of Information Ranking	3	7	6	8	4	5	1	2

Nonresearch

Method	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8
Subject Ranking	1.5	1.5	8	6	5	3	7	4
Derived Ease of Use Ranking	1	3	8	7	5	4	6	2
Derived Amount of Information Ranking	1	7	5	6	3	8	2	4

Table 10. Derived Rankings

rank correlation coefficient was used for this test (Table 11). The correlation of the ranks derived from the ease of use ratings to the

Derived Rankings from	Subject Rankings: Research	Subject Rankings: Nonresearch
Ease of Use	0.868	0.887
Amount of Information	-0.166	-0.113

Table 11. Spearman Rank Correlation Coefficients

subject rankings were significant for both research and nonresearch groups, while the correlation of the ranks derived from the amount of information ratings to the subject ranking were not significant for either group. Significance was determined at the 0.05 level in all cases.

INTERPRETATION OF RESULTS:

The initial test determining the degree of agreement among the subjects in the ranking of the methods showed that the subjects applied essentially the same standard in ranking the eight methods.[7] The ranking of the totals for each group can be taken as the best estimate of the ranking based on the given data. The significance of the statistic, W, is not interpreted to mean that the estimated rankings are correct by an external criterion, but rather that they are the best estimate for the given data. The fact that W was significant in all cases was considered important because the subsequent analysis was based on the reliability of the rankings of the totals.

The comparison of the estimated rankings for the two groups using the Spearman test showed that there was no significant difference between the two groups in the rankings. The null hypothesis was, H_o : The ranks are identical. The net result of the first two tests was that the two groups used essentially the same criterion within the groups for ranking the items and that, on the basis of the test, there was essentially no difference between the two groups in the resulting rankings.

For the data in Part II, t tests were applied to test for significant differences in the mean ratings on a given method between the two groups. The null hypothesis for comparison of the two means on a given rating of a method was $H_o : \mu_R = \mu_{NR}$. Since no difference was found to be significant on the basis of the data, it was inferred that no meaningful differences existed between the average ratings of

the group (i.e. for each method, both groups gave the same average rating). This shows that, given a set of methods, both groups gave essentially the same response in each case when asked to rate the methods according to ease of use and amount of information expected.

To test the correlation between the results of Part I and the results of Part II, the ratings of Part II were converted to ranks by ranking the mean ratings. Since the rankings of Part I were on an ordinal scale, the inferences about the correlation of the data was kept at the ordinal level. Thus the inferences say nothing about the relative magnitude of the ratings, but only about their rank.[8] The results of this analysis showed a marked correlation between the ease of use ratings and the subject rankings for both research and nonresearch, and a marked lack of correlation between the amount of information ratings and the subject rankings.

The statistic used to test the correlation, r_s, ranges from +1 to −1. A value for r_s of +1 corresponds to perfect agreement, and a value of −1 corresponds to "perfect" inverse agreement (i.e. the highest subject ranked item has the lowest derived rank, etc.). Thus values close to +1 reflect a high degree of agreement between the two variables, whereas a value close to zero represents randomness or lack of agreement. On the basis of this statistic, it is clear that the subjects preference ranking was far more closely related to his evaluation of the method's ease of use than to his evaluation of amount of information expected. Alternatively, a subject's preference for a method of getting information is more likely to correspond to his estimation of the method's ease of use

than his estimation of amount of information expected. This inference holds for both research and nonresearch personnel.

The actual methods listed in the questionnaire and the hypothetical situations which served as a framework for the rankings and in some sense for the rating also, played a relatively minor part in the study. No attempt was made to make inferences about the methods themselves except that one was ranked or rated above another. Thus the hypothetical situations and methods themselves served only to gather data about the relationships between the two groups of subjects and between the ratings and the rankings. The interest in the relationships between the sets of data exclusively served as a justification for the use of the structured questionnaire. No attempt was made to discover (a) what a subject felt he would actually do, or (b) what a subject actually does in the given situations. Such observations have been reported in what are generally known as information user studies, some of which are listed in the bibliography.

A significant limitation of the procedure used in the investigation was that there was no way of validating the questionnaire to test its sensitivity to the variables to be measured. General procedure requires the test to be administered to samples where differences in the tested variable are known to exist to determine the sensitivity of the test to the variable in question. Since the experimental hypothesis was that no differences existed between the two groups tested, no population could be found where differences were known to exist. The consistency of the data and the significance of the tests, however,

imply that the testing procedure was valid. The similarity of the results to the results of studies observing actual behavior also provides support for the validity of the experimental procedure.

DISCUSSION:

Although much research has been done to study the information gathering behavior of professional personnel, very little has been done to establish the reasons for the observed behavior. The relative priority of the most frequently used channels has been established by almost all studies, and in almost every case, the analysis has shown that one of the most significant factors in determining the priority is the availability of the source. The implication is that the information gathering behavior of users is dictated primarily by the facilities available and changes to reflect a change in the availability of facilities. The importance of availability of information is consistent with the results of the present study and implies that the primary attribute of any information gathering method is its ease of use.[9]

Although the methods listed in the study were only secondarily important, the overall preference listing of the methods shows an interesting correlation to a study where actual performance was measured In a study investigating the utilization of information sources in research and development proposal preparation (Allen, 1964), information sources were divided into three categories: (a) literature search; (b) consulting with laboratory specialists; and (c) consulting with outside sources. The data from the study show, among other things that the

mean times spent in each activity were: (a) 28.4 man hours; (b) 17.2 man hours; and (c) 11.6 man hours, respectively. If one divides the information gathering methods of the present study in a similar manner (Table 12), there seems to be a one to one relationship between the preference rankings given and the results of Allen's study, if preference can be equated with time spent.[10]

Method	Overall Average Rank	Allen's Category	Average Man-Hours
Search your personal library.	1	Literature Search	28.4
Search the material in the same building where you work, excluding your personal library.	2		
Visit a knowledgeable person nearby (within your organization)	3	Consulting with Lab. Specialists	17.2
Consult a reference librarian.	4		
Write a letter requesting information from a knowledgeable person — 20 miles away or more.	7	Consulting Outside Specialists	11.6
Visit a knowledgeable person — 20 miles away or more.	8		

Note: Two of the methods were not decidable (Nos. 4 and 8).

Table 12. Comparison of two studies

The comparison of the two studies shows that there is substantial agreement between the results of the present study giving the subject's

opinion of preference and Allen's study showing actual performance. Such agreement combined with the general inference of user studies concerning the importance of availability can be considered a substantiation of the validity of the present study.

It may also be inferred from the agreement between the two studies that asking the subject for opinions concerning information gathering behavior yields data as meaningful as the data from observation studies, provided the sample is sufficiently large. Since observation studies are more complex and difficult to control, the use of structured questionnaires requesting opinions could greatly simplify and thereby expand the scope of studies investigating information gathering behavior.

The scope of the study was limited to professional personnel in government and industrial organizations. The inferences of the study are assumed to hold only for this population. Hanson (1964), in a study of information seeking behavior found that industrial and government personnel differed from those in academic institutions in a number of ways. He found the organizational differences more pronounced than the differences across disciplines.

> ...we find that the differences in needs and demands for information associated with the kind of employment are on the whole greater than those associated with discipline. That is to say, although there are differences between scientists and engineers as such, and between for instance physicists and chemists, these are less marked than the differences between people, irrespective of discipline, working in industry and those working in, say, academic institutions. Comparing these last two we find that people working in industry

> wanted information more quickly than the academics; ... In most respects people working in Government establishments behaved in much the same way (as those in industry).[11]

Hanson's study seems to substantiate the result that fewer significant differences exist between professional disciplines within industry and government organizations than between types of institutions and that the professionals are primarily concerned with the ease of obtaining information.

CONCLUSIONS:

From the results of the experiment, it is reasonable to conclude that: (a) research and nonresearch professional personnel in industry or government do not differ to any appreciable extent in their evaluation of information gathering methods; and (b) the preference for a given method reflects the estimated ease of use of the method rather than the amount of information expected. These conclusions in conjunction with the results of observation studies imply further that the basic parameter for the design of any industrial information system should be the system's ease of use, rather than the amount of information provided, and that if an organization desires to have a high quality of information used, it must make ease of access of primary importance.

Since the optimization of all variables has not yet become a practical reality, the design of an actual system usually permits the optimization of some parameters only at the expense of others. If all other variables such as cost, environment, etc., are held constant, a system can be designed to provide a maximum amount of information at the

expense of effort, or it can be designed to minimize effort at the expense of information yield. Cast in the terms of information retrieval, one can maximize either recall or precision. In industrial environments, the design criteria should lean toward the minimization of effort (i.e. precision).

A secondary conclusion, supported by the correlation of the result with observation studies, is that user surveys can be accomplished by the use of a well designed structured questionnaire technique, without resorting to direct observation, if the sample is large enough. The questionnaire technique is far more efficient and less expensive than observation surveys.

On the basis of the present study, it appears that further research using similar techniques could accurately identify the relationship of information system characteristics to the system environment. Such further research might, for example, examine the relationships between academic and industrial environments. A further examination of the factors involved in the concept "ease of use", (e.g. time, distance, or intellectual effort), should also prove useful in providin a more detailed description of the information gathering process and system environments.

Appendix I

The Questionnaire

Questionnaire

This is a questionnaire which seeks to determine your evaluation of various methods of gathering information. There are three hypothetical problems which you might encounter in your work. Below each hypothetical problem are various methods for gathering the information necessary for the solution of the problem. You are asked, in Part I, to rank all the items as to their usefulness in the given situation and then, in Part II, to evaluate each item as to the amount of information it will provide and as to the method's ease of use. These are relative judgements and are made by checking the appropriate number on the seven point scale.

If you would be interested in a summary of the results of the questionnaire, place your name and address below.

Thank you for your cooperation.

V. Rosenberg
Center for the
Information Sciences
Lehigh University
Bethlehem, Pennsylvania 18015

_____

_____

_____

_____

Question No. 1

Do you spend more than 50% of your time in what you consider research or research related activities?

____ Yes

____ No

Hypothetical Situation No. 1

You are working on a design for a procedure or experiment and wish to know if similar work has been done or is currently being done by someone else.

Please rank the methods listed below according to your preference for getting the required information. No. 1 for most useful, etc.

____ Search your personal library.

____ Search material in the same building where you work, excluding your personal library.

____ Visit a knowledgeable person - 20 miles away or more.

____ Use a library that is not within your organization.

____ Consult a reference librarian.

____ Visit a knowledgeable person nearby (within your organization.)

____ Write a letter requesting information from a knowledgeable person - 20 miles away or more.

____ Telephone a knowledgeable person who may be of help.

Hypothetical Situation No. 2

You are preparing a proposal for a new project either to the management of your organization or to an outside agency. You wish to substantiate the proposal with a thorough bibliography. The proposal involves approximately $60,000.

Please rank these "methods" according to their usefulness in this situation.

____ Telephone a knowledgeable person who may be of help.

____ Consult a reference librarian.

____ Use a library that is not within your organization.

____ Search material in the same building where you work, excluding your personal library.

____ Visit a knowledgeable person nearby (within your organization.)

____ Search your personal library.

____ Visit a knowledgeable person - 20 miles away or more.

____ Write a letter requesting information from a knowledgeable person - 20 miles away or more.

Hypothetical Situation No. 3

You wish to gather information in order to write an article in your area of specialization for a trade or research journal.

Again please rank the "methods" listed below.

____ Visit a knowledgeable person nearby (within your organization.)

____ Visit a knowledgeable person - 20 miles away or more.

____ Search material in the same building where you work, excluding your personal library.

____ Search your personal library.

____ Telephone a knowledgeable person who may be of help.

____ Write a letter requesting information from a knowledgeable person - 20 miles away or more.

____ Consult a reference librarian.

____ Use a library that is not within your organization.

Part IIA

Please rate each of the information gathering methods, as listed below, according to the criteria indicated by circling the appropriate number on the seven point scale.

Please give these ratings without referring back to Part I.

1. Visit a knowledgeable person - 20 miles away or more.

EASE OF USE

extremely simple | 1 | 2 | 3 | 4 | 5 | 6 | 7 | extremely difficult

2. Search your personal library.

EASE OF USE

extremely simple | 1 | 2 | 3 | 4 | 5 | 6 | 7 | extremely difficult

3. Use a library that is not within your organization.

EASE OF USE

extremely simple | 1 | 2 | 3 | 4 | 5 | 6 | 7 | extremely difficult

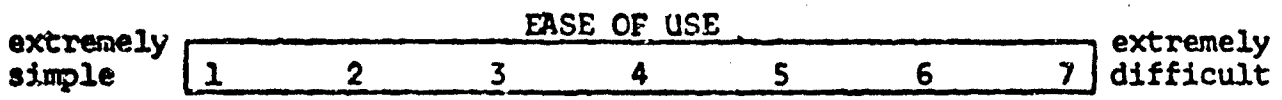
4. Visit a knowledgeable person nearby (within your organization).

EASE OF USE

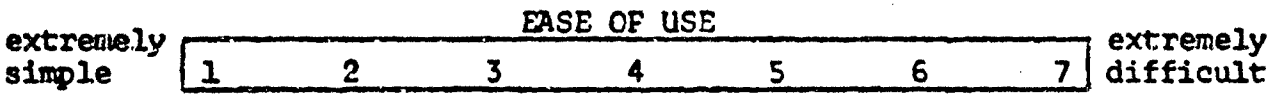
extremely simple | 1 | 2 | 3 | 4 | 5 | 6 | 7 | extremely difficult

Part IIA (Cont'd.)

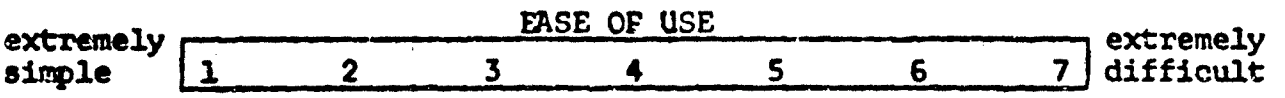
5. Consult a reference librarian.



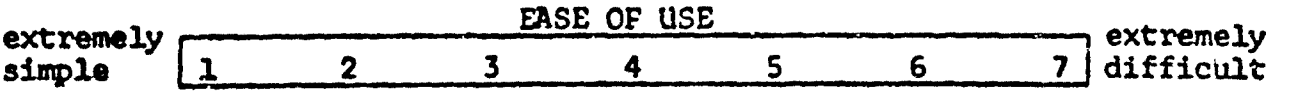
6. Search material in the building where you work, excluding your personal library.



7. Write a letter requesting information from a knowledgeable person - 20 miles away or more.



8. Telephone a knowledgeable person who may be of help.

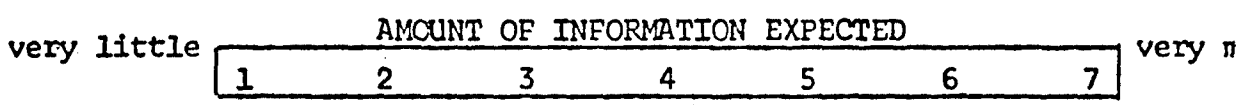


Part IIB

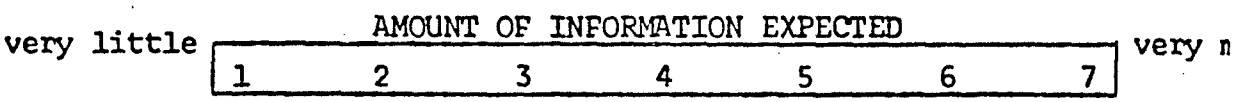
Please rate each of the information gathering methods, as listed below, according to the criteria indicated by circling the appropriate number on the seven point scale.

Please give these ratings without referring back to Part I.

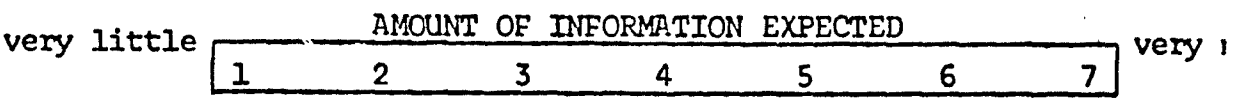
1. Visit a knowledgeable person nearby (within your organization).



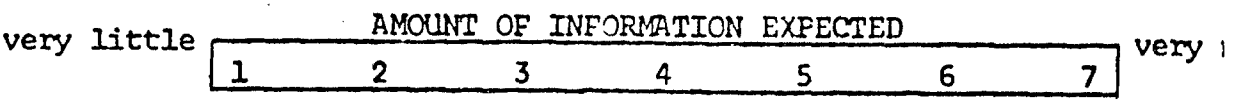
2. Write a letter requesting information from a knowledgeable person - 2(miles away or more.



3. Use a library that is not within your organization.



4. Consult a reference librarian.



Part IIB (Cont'd.)

5. Telephone a knowledgeable person who may be of help.

very little — AMOUNT OF INFORMATION EXPECTED — very much

1 2 3 4 5 6 7

6. Search your personal library.

very little — AMOUNT OF INFORMATION EXPECTED — very much

1 2 3 4 5 6 7

7. Search material in the building where you work, excluding your personal library.

very little — AMOUNT OF INFORMATION EXPECTED — very much

1 2 3 4 5 6 7

8. Visit a knowledgeable person - 20 miles away or more.

very little — AMOUNT OF INFORMATION EXPECTED — very much

1 2 3 4 5 6 7

Appendix II

Data for Part I

SUB.NO.	QUEST.	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
100	1	2	3	8	5	7	4	6	1
101	1	4	5	3	6	7	1	8	2
102	1	4	6	3	5	8	2	4	1
103	1	8	3	5	4	6	1	7	2
104	1	3	2	8	6	1	5	7	4
105	1	1	3	6	5	8	2	7	4
106	1	3	4	7	6	5	1	8	2
107	1	1	2	7	8	4	3	6	5
108	1	3	1	7	6	8	2	5	4
109	1	5	3	8	6	4	2	7	7
110	1	2	3	8	6	5	1	4	7
111	1	1	5	7	3	8	4	6	2
112	1	2	1	7	4	3	5	8	6
113	1	1	2	8	6	5	4	7	3
114	1	1	4	8	5	3	2	7	6
115	1	1	2	7	6	5	4	8	3
116	1	8	1	6	2	3	7	4	5
117	1	2	6	8	5	1	7	3	4
118	1	1	4	6	5	2	3	7	8
119	1	1	2	6	3	8	4	7	5
120	1	1	3	6	4	5	2	8	7
121	1	1	3	8	5	2	7	6	4
122	1	5	2	8	3	1	4	7	6
123	1	2	1	8	5	4	3	7	6
124	1	2	6	8	7	1	3	5	4
125	1	1	3	7	8	2	4	6	5
126	1	3	1	8	2	5	4	6	7
135	1	8	3	6	5	4	2	7	1
136	1	1	3	8	7	4	5	6	2
137	1	8	3	5	4	7	2	6	1
138	1	1	3	8	5	6	2	7	4
139	1	3	2	4	1	7	6	8	5
140	1	3	2	7	4	8	1	6	5
141	1	1	2	8	6	5	3	7	4
142	1	2	3	4	1	8	7	5	6
143	1	1	4	6	5	8	2	7	3
144	1	1	2	7	6	8	3	5	4
145	1	1	3	7	8	4	2	6	5
146	1	1	2	6	4	5	3	8	7
147	1	2	1	8	3	4	7	5	6
148	1	1	2	7	6	3	4	8	5
160	1	3	2	8	5	6	4	7	1
161	1	1	3	5	7	8	2	6	4
180	1	1	3	6	7	5	2	8	4
181	1	1	2	8	7	6	3	4	5
182	1	1	2	7	3	8	4	6	5
183	1	1	2	8	5	3	4	7	6
184	1	1	2	5	7	8	3	6	4
185	1	1	2	7	4	3	6	8	5
186	1	3	2	8	4	1	5	7	6
187	1	1	3	7	6	5	4	8	2
188	1	1	3	8	6	5	4	7	2
Totals =		118	142	354	262	260	181	336	216

Table 13. Research Personnel – Question No.1 (Data)

SUB.NO.	QUEST.	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
100	2	1	4	6	8	7	2	5	3
101	2	1	2	8	6	3	4	7	5
102	2	8	7	5	1	2	3	4	6
103	2	3	1	7	2	5	6	8	4
104	2	1	3	7	6	4	2	8	5
105	2	1	2	8	3	7	4	6	5
106	2	5	2	7	6	1	3	8	4
107	2	2	1	8	7	3	4	6	5
108	2	8	1	7	4	5	2	6	3
109	2	3	2	8	4	1	6	7	5
110	2	2	3	8	4	1	6	5	7
111	2	3	4	7	1	8	2	5	6
112	2	1	2	7	4	3	5	8	6
113	2	1	2	8	3	4	6	7	5
114	2	1	2	8	3	4	6	7	5
115	2	1	2	8	6	5	4	7	3
116	2	8	1	5	3	2	7	6	4
117	2	2	6	7	8	1	5	4	3
118	2	1	5	6	3	2	4	7	8
119	2	1	2	8	3	4	5	7	6
120	2	1	2	7	4	3	5	6	8
121	2	1	3	7	5	2	6	8	4
122	2	5	2	8	3	1	6	7	4
123	2	4	1	8	3	2	5	6	7
124	2	2	3	8	5	1	4	7	6
125	2	1	3	8	7	2	4	6	6
126	2	3	1	8	2	4	5	6	7
135	2	8	2	6	3	1	4	7	5
136	2	1	3	6	5	2	4	7	8
137	2	8	2	6	1	3	5	7	4
138	2	1	2	7	4	3	6	8	5
139	2	4	1	7	2	3	5	8	6
140	2	3	1	7	4	8	2	6	5
141	2	1	2	8	5	3	4	7	6
142	2	3	2	5	1	8	4	6	7
143	2	2	4	6	1	5	3	7	8
144	2	3	2	7	4	1	6	5	8
145	2	1	3	7	8	4	2	6	5
146	2	1	2	6	4	5	3	8	7
147	2	2	1	8	3	4	5	7	6
148	2	3	2	7	6	1	5	8	4
160	2	5	3	7	4	6	2	8	1
161	2	2	1	7	8	3	4	6	5
180	2	1	3	6	7	4	2	8	5
181	2	2	1	7	6	3	4	8	5
182	2	1	2	6	3	8	4	7	5
183	2	1	4	8	3	2	5	7	6
184	2	1	2	5	7	8	4	6	3
185	2	1	2	7	5	4	3	8	6
186	2	2	1	8	4	3	6	7	5
187	2	1	3	7	6	5	4	8	2
188	2	3	2	8	5	1	6	7	4
Totals =		132	122	366	223	185	223	351	270

Table 14. Research Personnel – Question No.2 (Data)

SUB.NO.	QUEST.	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
100	3	1	2	5	7	8	3	6	4
101	3	1	2	8	6	4	5	7	3
102	3	2	3	7	1	8	6	5	4
103	3	2	1	8	7	4	5	6	3
104	3	1	5	7	3	2	6	8	4
105	3	3	2	7	5	8	1	6	4
106	3	5	4	8	6	2	1	7	3
107	3	1	2	8	4	3	5	7	6
108	3	1	2	8	4	6	3	7	5
109	3	5	1	8	7	2	6	3	4
110	3	1	3	8	6	4	2	7	5
111	3	3	4	7	2	8	1	6	5
112	3	1	2	6	4	3	5	8	7
113	3	1	2	8	5	3	6	7	4
114	3	1	2	8	6	3	5	7	4
115	3	1	3	7	5	2	6	8	4
116	3	8	2	6	3	1	4	7	5
117	3	2	5	8	3	1	4	7	6
118	3	1	4	5	6	2	3	7	8
119	3	1	2	8	3	4	5	7	6
120	3	1	4	8	5	2	3	7	6
121	3	1	3	8	5	2	6	7	4
122	3	5	2	8	3	1	4	7	6
123	3	1	2	8	3	5	4	7	6
124	3	2	3	8	5	1	4	7	6
125	3	1	7	6	8	2	3	4	5
126	3	3	1	8	2	5	4	6	7
135	3	8	1	6	5	2	3	7	4
136	3	1	2	6	8	4	5	7	3
137	3	8	2	5	1	3	4	7	6
138	3	1	2	7	4	5	3	8	6
139	3	1	2	5	3	7	4	8	6
140	3	1	2	7	3	8	4	6	5
141	3	1	3	8	6	5	4	7	2
142	3	1	3	5	2	8	4	6	7
143	3	1	2	7	3	8	4	6	5
144	3	1	2	7	5	8	3	4	6
145	3	1	4	7	6	5	2	8	3
146	3	1	2	6	4	5	3	8	7
147	3	2	1	8	3	4	7	5	6
148	3	1	5	7	4	2	6	8	3
160	3	1	2	8	6	5	3	7	4
161	3	1	2	5	8	7	3	6	4
180	3	1	2	7	6	4	5	8	3
181	3	1	2	8	5	6	3	7	4
182	3	1	3	6	5	8	4	7	2
183	3	1	2	8	4	3	5	7	6
184	3	1	2	4	7	8	3	6	5
185	3	1	2	7	4	3	6	8	5
186	3	1	2	8	4	3	5	7	6
187	3	1	2	7	3	5	4	8	6
188	3	1	4	8	3	2	6	7	5
Totals =		96	133	366	236	224	213	351	253
Totals over all		346	397	1086	721	669	617	1038	739

Table 15. Research Personnel – Question No.3 (Data)

SUB.NO.	QUEST.	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
200	1	2	3	7	6	8	1	5	4
201	1	8	7	4	6	5	3	2	1
202	1	3	6	7	2	1	8	5	4
203	1	1	3	7	5	6	2	8	4
204	1	8	1	7	3	4	2	5	6
205	1	1	2	6	5	4	8	3	7
206	1	1	3	8	6	4	2	7	5
207	1	1	2	8	7	5	4	6	3
209	1	8	2	7	6	5	1	4	3
210	1	8	1	6	5	7	2	3	4
211	1	2	4	8	6	7	3	5	1
212	1	5	1	7	3	2	6	8	4
213	1	5	2	8	1	3	4	7	6
214	1	1	3	7	8	4	2	5	6
215	1	1	2	8	7	5	3	6	4
216	1	4	5	7	6	3	1	8	2
217	1	3	4	7	8	5	2	6	1
218	1	1	2	5	8	7	3	6	4
219	1	7	5	8	1	4	3	6	2
220	1	1	7	4	8	5	2	6	3
221	1	3	4	8	6	1	2	7	5
222	1	5	4	8	6	2	3	7	1
223	1	3	4	8	7	5	1	6	2
224	1	1	4	8	5	6	3	7	2
225	1	7	6	8	5	2	4	3	1
226	1	8	1	7	4	3	5	6	2
227	1	1	4	6	8	5	3	7	2
228	1	8	3	5	6	2	4	7	1
229	1	1	2	8	3	6	5	7	4
230	1	1	2	8	6	5	3	7	4
231	1	1	4	7	5	6	2	8	3
232	1	6	5	2	7	8	1	4	3
233	1	5	6	3	7	8	1	4	2
234	1	4	1	5	8	7	3	6	2
235	1	1	3	7	5	2	4	8	6
240	1	8	2	7	4	3	1	6	5
241	1	1	2	6	5	8	3	7	4
242	1	3	4	6	7	5	2	8	1
260	1	1	2	8	7	6	4	5	3
261	1	3	4	6	7	8	1	5	2
280	1	1	2	8	4	3	5	7	6
281	1	8	5	1	4	3	2	7	6
282	1	3	2	7	4	1	5	8	6
283	1	1	5	8	7	4	2	6	3
Totals =		155	146	291	244	203	131	264	150

Table 16. Non Research Personnel – Question No.1 (Data)

SUB.NO.	QUEST.	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
200	2	1	2	8	3	6	4	7	5
201	2	8	7	3	6	5	1	4	2
202	2	2	6	8	3	1	5	7	4
203	2	2	3	7	4	1	5	8	6
204	2	8	2	7	4	3	1	6	5
205	2	8	6	7	2	1	5	4	3
206	2	1	2	7	6	5	3	8	4
207	2	1	2	8	7	5	4	6	3
209	2	8	2	7	6	5	1	4	3
210	2	2	1	8	7	6	3	5	4
211	2	1	2	8	6	5	3	7	4
212	2	6	1	7	3	2	4	8	5
213	2	8	1	7	2	5	3	6	4
214	2	2	3	7	8	4	1	6	5
215	2	1	4	8	7	5	3	6	2
216	2	1	5	7	6	4	2	8	3
217	2	3	4	7	6	5	2	8	1
218	2	1	2	4	7	8	5	6	3
219	2	6	3	8	1	2	5	7	4
220	2	1	7	4	8	5	2	6	3
221	2	8	2	5	7	1	3	6	4
222	2	7	1	8	3	5	2	6	4
223	2	2	3	7	8	1	4	6	5
224	2	1	2	8	3	4	5	7	6
225	2	8	3	7	2	1	4	6	5
226	2	1	2	8	6	4	3	7	5
227	2	1	3	7	6	5	4	8	2
228	2	7	1	5	6	3	4	8	2
229	2	2	3	8	1	4	6	7	5
230	2	1	3	8	6	5	4	7	2
231	2	3	1	5	7	8	2	6	4
232	2	5	1	8	4	6	2	7	3
233	2	3	7	2	8	6	4	1	5
234	2	1	2	7	3	6	5	8	4
235	2	1	3	7	6	2	4	8	5
240	2	8	2	7	5	1	4	6	3
241	2	1	2	7	5	8	3	6	4
242	2	1	3	7	4	2	5	8	6
260	2	1	2	7	6	3	5	8	4
261	2	8	3	6	5	7	1	4	2
280	2	1	3	8	4	2	5	7	6
281	2	7	3	8	2	1	4	6	5
282	2	4	3	6	2	1	5	8	7
283	2	1	4	8	7	5	2	6	3
Totals =		154	127	301	218	174	152	284	174

Table 17. Non Research Personnel – Question No.2 (Data)

SUB.NO.	QUEST.	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
200	3	1	2	8	3	5	4	7	6
201	3	8	7	3	6	5	2	4	1
202	3	3	4	8	1	2	7	6	5
203	3	1	2	7	5	4	3	8	6
204	3	1	2	8	6	5	3	7	4
205	3	1	2	7	6	4	3	5	3
206	3	1	2	8	4	5	3	6	7
207	3	1	2	8	6	5	3	7	4
209	3	8	2	7	5	4	1	6	3
210	3	1	2	8	4	3	5	7	6
211	3	1	2	7	6	5	3	8	4
212	3	4	1	7	3	2	5	8	6
213	3	1	2	8	3	7	4	6	5
214	3	2	4	5	8	7	1	6	2
215	3	1	2	8	4	3	5	7	6
216	3	1	2	7	4	3	5	8	6
217	3	3	4	6	7	5	2	8	1
218	3	1	2	8	3	4	6	7	5
219	3	1	8	6	2	3	5	7	4
220	3	1	7	4	8	5	2	6	3
221	3	4	3	7	2	1	5	8	6
222	3	3	2	5	7	6	1	8	4
223	3	1	5	4	8	7	6	3	2
224	3	1	2	8	5	7	3	6	4
225	3	2	6	7	8	5	1	4	3
226	3	3	4	8	7	2	1	6	5
227	3	1	3	7	6	5	2	8	4
228	3	2	1	6	4	3	5	7	8
229	3	1	2	8	3	6	5	7	4
230	3	3	1	8	4	2	5	7	6
231	3	4	3	6	2	1	8	5	7
232	3	3	2	8	7	5	1	6	4
233	3	3	4	2	8	7	1	6	5
234	3	1	2	5	7	6	4	8	3
235	3	1	3	7	5	2	4	8	6
240	3	1	2	8	3	4	5	7	6
241	3	1	2	7	3	4	5	8	6
242	3	1	3	6	7	5	4	8	2
260	3	1	2	7	6	3	4	8	5
261	3	4	3	7	6	8	1	5	2
280	3	1	2	8	4	3	5	7	6
281	3	2	3	6	1	4	5	8	7
282	3	3	2	6	4	1	5	7	8
283	3	1	3	8	6	2	4	7	5
Totals =		90	126	297	217	185	162	296	205
Totals over all		399	399	889	679	562	445	844	529

Table 18. Non Research Personnel – Question No.3 (Data)

Appendix III

Data for Part II

SUB.NO.	TYPE	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
100	0	1	2	4	3	5	1	3	2
101	0	1	1	7	4	4	1	7	1
102	0	1	3	1	2	7	1	1	1
103	0	1	5	4	3	7	3	6	4
104	0	1	7	7	1	1	1	3	1
105	0	1	3	2	4	6	1	3	4
106	0	1	4	6	3	3	1	5	2
107	0	1	2	7	6	3	4	6	5
108	0	1	1	5	2	4	1	6	3
109	0	2	3	6	5	1	2	1	1
110	0	1	3	5	4	3	2	6	3
111	0	1	4	7	2	6	2	5	3
112	1	1	1	4	2	1	1	2	1
113	1	1	2	6	6	2	2	5	3
114	1	1	2	6	2	1	1	4	4
115	1	1	1	7	4	2	1	2	1
116	1	1	1	4	3	1	1	1	1
117	1	1	2	2	4	1	1	2	2
118	1	1	2	3	3	1	2	2	2
119	2	1	1	6	1	3	6	4	2
120	1	1	1	5	1	5	1	3	3
121	1	1	1	7	4	1	2	4	3
122	1	2	2	7	3	1	2	5	4
123	1	1	1	5	3	2	1	3	3
124	1	2	2	7	5	1	4	3	3
125	1	1	4	3	4	1	2	2	1
126	0	1	1	5	1	1	4	2	4
135	1	1	1	4	2	1	1	2	1
136	1	1	4	6	4	3	2	5	3
137	1	1	2	4	3	2	1	4	1
138	1	1	2	6	4	6	2	5	4
139	1	2	4	3	4	3	2	5	2
140	1	1	1	6	3	1	1	2	1
141	1	1	1	4	2	1	1	1	1
142	1	1	2	4	2	7	2	6	4
143	1	1	2	2	2	5	1	4	3
144	1	2	2	4	3	3	1	4	2
145	1	2	3	6	5	1	1	3	1
146	1	1	2	5	3	4	2	3	2
147	1	1	2	6	4	2	2	3	1
148	1	2	3	6	3	1	1	5	2
160	2	1	1	6	4	3	6	6	2
161	2	1	2	4	5	6	4	3	3
180	2	1	1	5	4	1	5	6	1
181	2	1	2	7	6	6	7	3	4
182	2	1	2	3	3	3	3	1	2
183	2	2	3	6	5	1	6	4	3
184	2	1	1	2	4	7	2	3	1
185	2	3	1	4	2	1	4	1	2
186	2	1	3	6	4	1	6	3	3
187	2	1	4	4	5	5	4	6	2
188	2	2	3	7	4	2	7	5	1
Totals =		63	116	258	175	150	125	189	119

Table 19. Research Personnel (Data) -- Ease of Use Rating

SUB.NO.	TYPE	M[1]	M[2]	M[3]	M[4]	[M5]	M[6]	M[7]	M[8]
100	0	3	4	5	5	6	5	5	6
101	0	2	3	7	3	1	5	2	3
102	0	1	3	6	6	2	6	6	6
103	0	4	3	4	3	4	6	1	3
104	0	6	4	4	7	6	4	4	3
105	0	4	7	6	4	7	6	4	5
106	0	3	3	6	7	6	6	4	5
107	0	7	5	7	3	6	6	6	5
108	0	2	4	2	4	3	4	1	1
109	0	3	6	4	5	7	4	3	4
110	0	5	7	6	5	7	7	4	5
111	0	2	6	6	7	2	6	5	5
112	1	5	6	5	6	7	6	4	5
113	1	6	4	6	6	2	4	2	4
114	1	5	4	3	4	3	3	3	3
115	1	7	7	2	4	5	4	2	7
116	1	1	6	5	6	6	4	2	3
117	1	7	5	6	4	7	5	5	6
118	1	6	5	5	4	7	4	6	5
119	2	7	7	2	7	5	7	2	6
120	1	7	5	2	4	4	5	2	1
121	1	7	5	5	3	6	6	3	6
122	1	2	7	5	6	7	4	2	2
123	1	4	7	3	6	4	3	3	2
124	1	4	4	2	2	7	2	2	3
125	1	6	3	6	6	7	5	5	5
126	0	4	7	1	7	1	2	2	1
135	1	1	7	6	6	6	5	5	4
136	1	6	5	3	4	2	5	3	5
137	1	1	3	3	4	2	3	1	4
138	1	6	5	4	4	2	5	4	4
139	1	4	4	5	5	4	3	2	3
140	1	4	6	5	6	4	3	5	4
141	1	5	5	5	2	5	4	4	5
142	1	6	5	5	7	1	3	4	3
143	1	4	4	6	7	1	4	5	5
144	1	5	6	5	4	3	5	5	5
145	1	7	3	4	5	4	7	4	7
146	1	2	3	3	5	1	2	1	2
147	1	5	6	3	5	3	2	4	2
148	1	5	4	5	6	6	4	1	3
160	2	3	6	3	5	4	6	3	5
161	2	3	6	5	6	6	4	3	4
180	2	4	4	6	5	4	4	2	4
181	2	5	6	4	7	3	5	7	5
182	2	5	5	4	7	6	3	5	3
183	2	4	5	5	5	3	5	6	6
184	2	5	4	5	5	1	4	4	3
185	2	2	4	6	4	6	2	3	2
186	2	3	4	6	2	5	4	5	4
187	2	5	5	5	3	3	4	2	6
188	2	2	4	4	6	7	4	4	4
Totals =		222	256	236	259	227	229	182	212

Table 20. Research Personnel (Data) Amount of Information Ratings

SUB.NO.	TYPE	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
200	0	1	1	6	2	4	2	3	2
201	0	3	3	2	1	3	2	4	1
202	0	1	2	7	4	1	4	1	2
203	0	1	3	5	4	6	1	7	1
205	0	1	1	5	6	2	1	2	2
206	0	1	2	3	3	3	2	2	1
207	0	1	2	6	4	3	1	2	1
209	0	1	2	4	4	3	1	2	2
210	0	1	1	6	5	3	1	2	2
211	0	1	2	5	2	1	4	2	5
212	0	1	2	5	2	2	2	5	1
213	0	1	1	3	2	2	1	2	1
213	0	1	2	5	2	2	2	4	2
215	0	1	2	7	3	1	1	2	1
216	0	1	3	3	3	2	1	3	1
217	0	1	2	2	3	4	1	3	1
218	0	1	2	7	5	7	3	2	1
219	0	1	1	5	2	2	1	3	1
220	0	1	6	4	7	3	2	4	3
221	0	1	4	6	3	2	1	4	1
222	0	1	2	4	5	5	1	4	1
223	0	1	5	3	7	6	1	2	1
224	0	2	2	6	2	6	3	2	1
225	0	2	4	6	5	3	2	5	2
226	0	1	3	7	4	3	3	5	2
227	0	1	3	5	6	5	4	6	2
228	0	1	3	5	5	2	3	2	2
229	0	1	2	7	2	2	1	5	1
230	0	1	2	7	6	4	3	6	3
231	0	1	2	5	6	2	3	5	2
232	0	2	2	6	4	3	1	4	1
233	0	1	3	3	3	3	1	4	2
234	0	1	2	4	6	4	2	7	2
235	1	1	1	2	2	2	1	2	1
240	1	1	1	7	3	1	1	5	4
241	1	1	1	6	3	1	1	3	1
242	1	2	3	6	5	2	2	7	1
260	2	1	2	6	6	3	6	7	1
261	2	1	1	4	5	2	4	3	1
280	2	1	1	3	3	1	3	2	1
281	2	1	2	6	4	3	6	6	4
282	2	1	3	7	4	1	7	6	5
283	2	1	4	7	5	4	7	6	3
Totals =		49	98	218	168	124	100	163	76

Table 21. Non Research Personnel (Data)
Ease of Use Ratings

SUB.NO.	TYPE	M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
200	0	4	5	4	5	5	4	2	3
201	0	2	3	4	4	5	5	5	2
202	0	6	5	2	7	7	6	6	4
203	0	3	2	4	4	5	5	3	5
204	0	1	5	6	3	2	4	5	5
205	0	7	7	3	4	6	7	4	4
206	0	7	5	6	4	6	5	6	6
207	0	1	2	6	4	3	1	2	1
209	0	1	6	1	2	3	7	4	3
210	0	2	5	4	6	3	3	6	5
211	0	4	5	6	3	5	6	6	4
212	0	3	6	2	6	5	5	3	2
213	0	2	6	1	6	5	4	4	1
214	0	3	6	6	2	2	6	4	4
215	0	7	7	1	1	2	6	4	6
216	0	4	5	6	4	3	6	5	5
217	0	4	4	5	3	3	5	5	4
218	0	7	5	4	4	5	6	3	6
219	0	2	2	5	6	5	7	7	4
220	0	1	6	6	7	3	2	4	3
221	0	4	4	3	4	5	2	3	2
222	0	3	4	6	6	5	6	3	5
223	0	5	4	6	4	4	6	6	6
224	0	4	6	6	7	7	6	5	6
225	0	4	5	5	6	7	5	3	4
226	0	1	3	5	4	2	5	1	4
227	0	6	4	5	2	4	6	4	5
228	0	2	6	3	5	3	6	1	5
229	0	5	5	7	5	2	5	7	4
230	0	6	7	1	4	3	7	1	6
231	0	6	6	4	6	6	5	5	4
232	0	5	7	7	4	6	7	6	6
233	0	4	4	3	5	4	3	3	3
234	0	6	6	5	5	2	6	2	6
235	1	5	4	5	3	6	4	2	4
240	1	3	5	4	7	7	7	4	4
241	1	5	6	7	6	3	5	6	5
242	1	2	4	6	6	6	4	2	6
260	2	7	6	2	2	3	3	1	4
261	2	2	7	6	7	2	5	5	6
280	2	2	2	3	3	2	3	3	2
281	2	1	2	6	4	2	5	3	4
282	2	4	3	7	6	7	6	5	5
283	2	5	3	7	6	1	2	2	3
Totals =		168	210	201	202	182	218	171	186

Table 22. Non Research Personnel (Data)
Amount of Information Ratings

EASE OF USE RATINGS (TOTALS)
(MEANS)

	1	2	3	4	5	6	7	8	
R	63	116	258	175	150	125	189	119	TOTALS
NR	49	98	218	168	124	100	163	76	
R	1.212	2.231	4.962	3.365	2.885	2.404	3.635	2.288	MEANS
NR	1.140	2.279	5.070	3.907	2.884	2.326	3.791	1.767	
R	0.205	1.562	2.575	1.655	4.179	3.125	2.732	1.282	VARIANC
NR	0.167	1.224	2.390	2.410	2.242	2.778	3.049	1.155	
R	.453	1.250	1.605	1.286	2.044	1.768	1.653	1.132	ST.DEV
NR	.408	1.107	1.546	1.552	1.497	1.667	1.746	1.075	

AMOUNT OF INFORMATION RATINGS

	1	2	3	4	5	6	7	8	
R	222	256	236	259	227	229	182	212	TOTALS
NR	168	210	201	202	182	218	171	186	
R	4.269	4.923	4.538	4.981	4.365	4.404	3.500	4.077	MEANS
NR	3.818	4.773	4.568	4.591	4.136	4.955	3.886	4.227	
R	3.235	1.686	2.056	2.057	4.155	1.779	2.365	2.263	VARIA
NR	3.649	2.221	3.245	2.469	3.027	2.362	2.783	1.948	
R	1.799	1.299	1.434	1.434	2.038	1.334	1.538	1.504	ST.DE
NR	1.910	1.490	1.801	1.571	1.740	1.537	1.668	1.396	

NOTE: R = Research, NR = Nonresearch

Table 23. Means, Variance and Standard Deviation

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